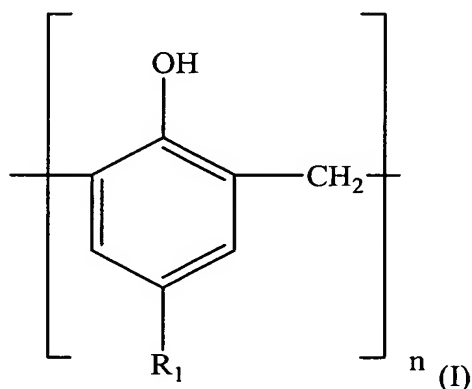


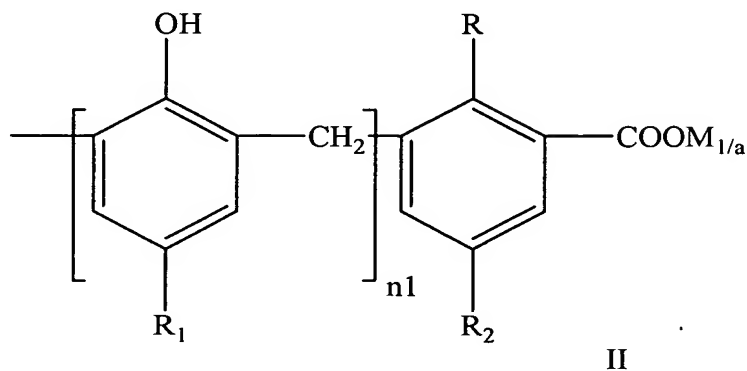
**In the Claims:**

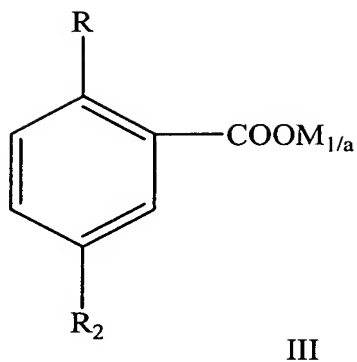
1. (Previously Presented) A color-developing agent resin composition comprising:  
Component 1: a phenolic resin comprising formula I



wherein n is an integer from 1 to 100; and

Component 2: a blend of graft copolymers of a phenolic resin and a multivalent metal salt polymer of a substituted aryl carboxylic acid, wherein at least a portion of said graft copolymers comprise formulas II and III





wherein

$R$  is  $C_1$ – $C_4$  linear alkyl, hydroxy or halogen;

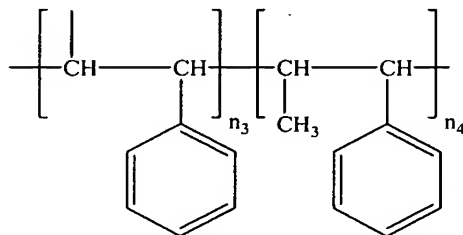
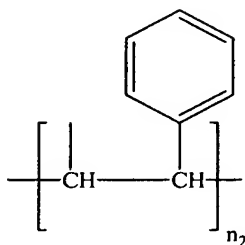
$R_1$  is individually  $C_1$ – $C_{12}$  linear or branched alkyl,  $C_1$ – $C_{12}$  halohydrocarbyl,  $C_6$ – $C_{12}$  aryl,  $C_7$ – $C_{12}$  aralkyl;

$n_1 = 1$ – $2$

$M$  is a multivalent metal ion;

$a$  represents the valence of  $M$ ; and

$R_2$  is



wherein  $n_2$  is an integer from 1–100;  $n_3$  is an integer from 1–100; and  $n_4$  is an integer from 1–100.

2. (Previously Presented) The color-developing agent resin composition of claim 1, wherein the content of the component 1 comprises about 5–50 % by weight, and component 2 comprises about 95–50 % by weight of the color-developing agent resin composition.

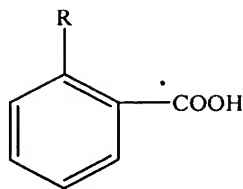
3. (Previously Presented) The color-developing agent resin composition of claim 1, wherein the content of the component 1 comprises about 10–30 % by weight, and the content of the component 2 comprises about 90–70 % by weight of the color-developing agent resin composition.

4. (Previously Presented) A color-developing agent resin emulsion comprising:
- (1) the color-developing agent resin composition of claim 1; and
  - (2) an emulsifying agent.

5. (Previously Presented) The color-developing agent resin emulsion of claim 4, wherein the emulsifying agent is selected from the group consisting of a surfactant, a modified starch and a polyvinyl alcohol.

6. (Previously Presented) A method for preparing the color-developing agent resin composition of claim 1 comprising:

- (1) synthesizing the polymer of a substituted aryl carboxylic acid and an alkenyl benzene in the presence of a catalyst in an inert solvent by using a substituted aryl carboxylic acid or ester having a general formula (IV) and an alkenyl benzene as feedstocks, and reacting the polymer with a multivalent metal ion to form a multivalent metal salt polymer of substituted aryl carboxylic acid as an intermediate;



(IV)

wherein

R is C<sub>1</sub>–C<sub>4</sub> linear alkyl, hydroxy or halogen;

(2) melting the mixture of a *p*-substituted phenol, the substituted aryl carboxylic acid or ester having a general formula (IV), a metal oxide and a catalyst, and reacting them to form a reaction product;

(3) adding the intermediate of step 1 to the reaction product of step 2, and reacting at about 80–150 °C for about 30–150 minutes to form a second reaction product;

(4) reacting the second reaction product of step 3 with an aldehyde under refluxing at about 80–130 °C for about 1–10 hours;

(5) dehydrating the product of step 4 at a temperature of about 90–150 °C under a vacuum at about 0.02–0.06 MPa to form a dehydrated product; and

(6) cooling the dehydrated product and milling the dehydrated product to produce a particle.

7. (Previously Presented) The method of claim 6, wherein:

(a) the molar ratio of the substituted aryl carboxylic acid to the *p*-substituted phenol in step 2 is about 0.05–1.55: 1 and the molar ratio of the metal oxide to the substituted aryl carboxylic acid is about 0.02–1.30: 1;

(b) the molar ratio of the metal salt of substituted aryl carboxylate to the *p*-substituted phenol in step 3 is about 0.05–5.0: 1; and

(c) the molar ratio of the aldehyde to the *p*-substituted phenol in step 4 is about 0.06–2.0: 1.

8. (Previously Presented) The method of claim 6, wherein the inert solvent is selected from the group consisting of organochlorines, alcohols, ethers, and ketones.

9. (Previously Presented) The method of claim 8, wherein the inert solvent used is selected from the group consisting of chloroethane, dichloroethane, trichloromethane, methanol, ethanol, propanol, butanol, isopropanol, isobutanol, dipropyl ether, diisopropyl ether, dibutyl ether, diisoamyl ether, acetone, butanone, pentanone, hexanone, hexanedione, heptanone and cyclohexanone.

10. (Previously Presented) The method of claim 6, wherein the *p*-substituted phenol is selected from the group consisting of alkylphenol, arylphenol and aralkylphenol, or a mixture thereof.

11. (Previously Presented) The method of claim 10, wherein the *p*-substituted phenol used is selected from the group consisting of *p*-methylphenol, *p*-ethylphenol, *p*-propylphenol, *p*-butylphenol, *p*-tert-butylphenol, *p*-amylphenol, *p*-hexylphenol, *p*-heptylphenol, *p*-octylphenol, *p*-tert-octylphenol, *p*-nonylphenol, *p*-decylphenol, *p*-undecylphenol, *p*-dodecylphenol, *p*-chlorophenol, *p*-bromophenol, *p*-phenylphenol and *p*-phenylalkyl phenol, or a mixture thereof.

12. (Previously Presented) The method of claim 6, wherein the aldehyde is selected from the group consisting of formaldehyde, acetaldehyde, propionaldehyde, butyraldehyde, amylaldehyde and benzaldehyde.

13. (Previously Presented) The method of claim 6, wherein the aldehyde is formalin comprising about 37 % by weight to about 50 % by weight.

14. (Previously Presented) The method of claim 6, wherein the substituted aryl carboxylic acid is selected from the group consisting of C<sub>1</sub>-C<sub>4</sub> linear alkylphenyl carboxylic acid, halophenyl carboxylic acid and salicylic acid, or an ester thereof.

15. (Previously Presented) The method of claim 6, wherein the metal oxide is an oxide of metal selected from the group consisting of Mg, Ca, Cu, Cd, Al, Zn, Cr, In, Sn, Co, Ni, Ti and Ba.

16. (Previously Presented) The method of claim 6, wherein the metal salt of substituted aryl carboxylic acid is zinc salt.

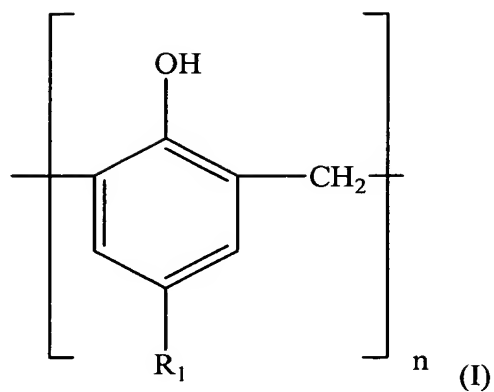
17. (Previously Presented) The method of claim 6, wherein the catalyst is an acidic or a basic catalyst, or a specified surfactant.

18. (Previously Presented) The method of claim 6, wherein the alkenyl benzene is selected from the group consisting of vinyl benzene, propenyl benzene, butenyl benzene, butadienyl benzene, isobutenyl benzene and cyclo-alkenyl benzene and the like.

19. (Previously Presented) A method for preparing a color-developing agent resin emulsion comprising:

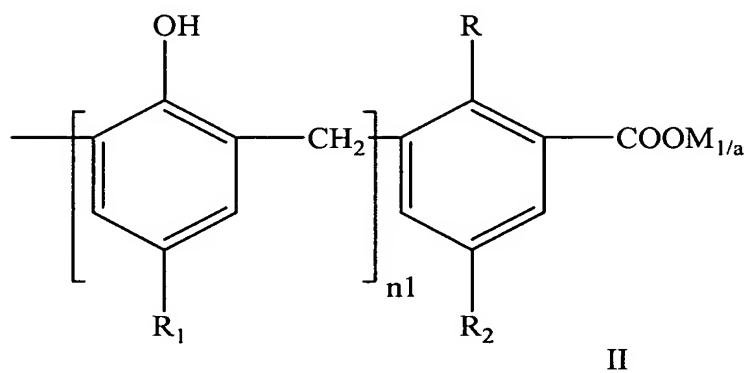
(1) a color-developing agent resin composition comprising:

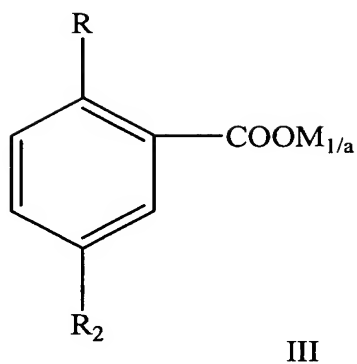
Component 1: a phenolic resin comprising formula I:



wherein n is an integer from 1 to 100; and

Component 2: a blend of graft copolymers of a phenolic resin and a multivalent metal salt polymer of a substituted aryl carboxylic acid, wherein at least a portion of said graft copolymers comprise formulas II and III





wherein

R is  $\text{C}_1\text{--C}_4$  linear alkyl, hydroxy or halogen;

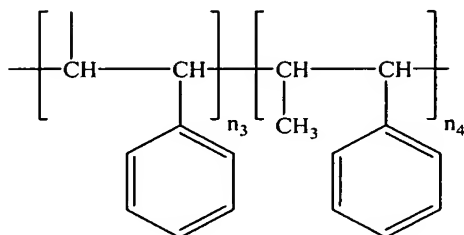
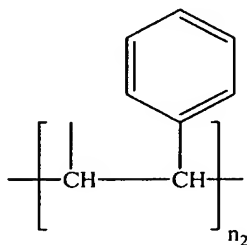
$\text{R}_1$  is individually  $\text{C}_1\text{--C}_{12}$  linear or branched alkyl,  $\text{C}_1\text{--C}_{12}$  halohydrocarbyl,  $\text{C}_6\text{--C}_{12}$  aryl,  $\text{C}_7\text{--C}_{12}$  aralkyl;

$n_1 = 1\text{--}2$

M is a multivalent metal ion;

a represents the valence of M; and

$\text{R}_2$  is





wherein  $n_2$  is an integer from 1–100;  $n_3$  is an integer of 1–100; and  $n_4$  is an integer of 1–100;  
and

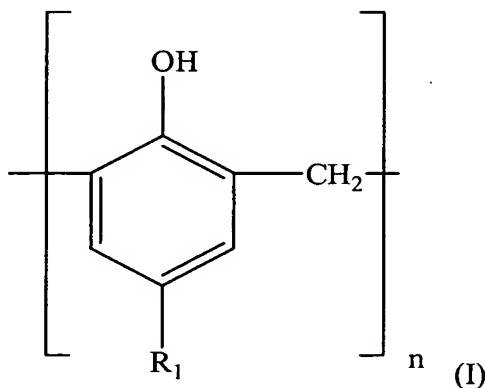
(2) an emulsifying agent,

wherein the color-developing agent resin composition is emulsified with the emulsifying agent in an emulsifying machine to obtain an oil-in-water emulsion with an average particle size of less than about  $1.5\mu\text{m}$ .

20. (Previously Presented) The method of claim 19, wherein the emulsifying agent comprises a surfactant, a modified starch or a polyvinyl alcohol.

21. (Previously Presented) A resin color-developing agent for no-carbon copying paper, wherein said resin color-developing agent comprises a color-developing agent resin composition comprising:

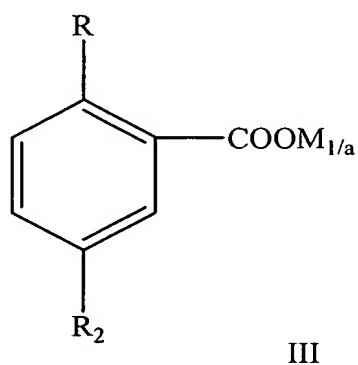
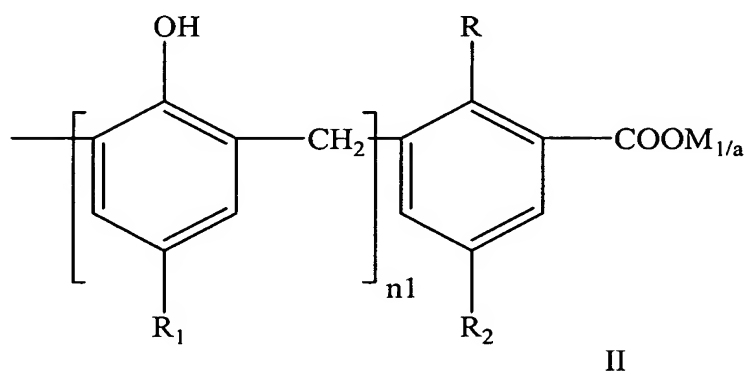
Component 1: a phenolic resin comprising formula I



wherein  $n$  is an integer from 1 to 100; (I)

and,

Component 2: a blend of graft copolymers of a phenolic resin and a multivalent metal salt polymer of a substituted aryl carboxylic acid, wherein at least a portion of said graft copolymers comprise formulas II and III



wherein

R is C<sub>1</sub>-C<sub>4</sub> linear alkyl, hydroxy or halogen;

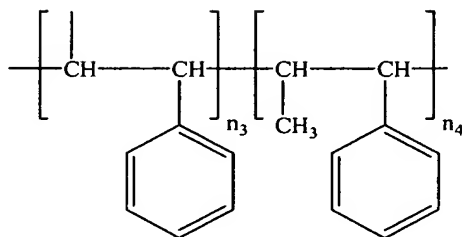
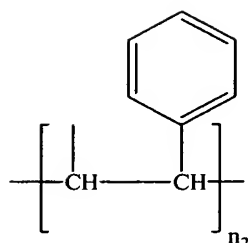
R<sub>1</sub> is individually C<sub>1</sub>-C<sub>12</sub> linear or branched alkyl, C<sub>1</sub>-C<sub>12</sub> halohydrocarbyl, C<sub>6</sub>-C<sub>12</sub> aryl, C<sub>7</sub>-C<sub>12</sub> aralkyl;

n<sub>1</sub> = 1-2

M is a multivalent metal ion;

a represents the valence of M; and

R<sub>2</sub> is



wherein  $n_2$  is an integer from 1–100;  $n_3$  is an integer of 1–100; and  $n_4$  is an integer of 1–100.

22. (Previously Presented) The color-developing agent of claim 21, further comprising an emulsifying agent, wherein the color-developing agent resin composition is emulsified with the emulsifying agent in an emulsifying machine to obtain an oil-in-water emulsion with an average particle size of less than about 1.5  $\mu\text{m}$ .

23. (Previously Presented) The color-developing agent resin composition of claim 1, wherein  $n_2$  is an integer from 1–10.

24. (Previously Presented) The color-developing agent resin composition of claim 1, wherein  $n_3$  is an integer from 1–10 and  $n_4$  is an integer from 1–10.